Science, Technology, and Telecommunications Committee

James Paul Holloway

Provost and Executive Vice President for Academic Affairs

INDIGENOUS PEOPLES' LAND AND TERRITORY ACKNOWLEDGMENT

Founded in 1889, the University of New Mexico sits on the traditional homelands of the Pueblo of Sandia. The original peoples of New Mexico—Pueblo, Navajo, and Apache—since time immemorial, have deep connections to the land and have made significant contributions to the broader community statewide. We honor the land itself and those who remain stewards of this land throughout the generations and also acknowledge our committed relationship to Indigenous peoples. We gratefully recognize our history.

UNM 2040 – Opportunity Defined

Vision

Be a global leader in realizing human potential, addressing critical community challenges, and demonstrating the power of inclusive diversity.

Mission

The University of New Mexico serves as the state's premier institution of higher learning and provider of health care by promoting discovery, generating intellectual and cultural contributions, honoring academic values, and serving our community by building an educated, healthy, and economically vigorous New Mexico.

UNM 2040: VALUES

Excellence:

We value excellence in all of our work, and we strive to perform and achieve at the highest levels.

Inclusion:

We respect and celebrate the differences of all persons and value working in a collaborative environment where diversity is cherished and there is a shared sense of belonging.

Environment:

We are dedicated to the protection of our planet to ensure the health, well-being, and success of future generations.

Integrity:

We value fairness, honesty, and transparency. We are good stewards of the resources that have been given to us.

Place:

We are dedicated to the peoples and places of New Mexico even as we reach for global impact for the benefit of all humanity.

UNM 2040: GOALS

GOAL ONE   ADVANCE NEW MEXICO

GOAL TWO   STUDENT EXPERIENCE & EDUCATIONAL INNOVATION

GOAL THREE   INCLUSIVE EXCELLENCE

GOAL FOUR   SUSTAINABILITY

GOAL FIVE   ONE UNIVERSITY

The University of New Mexico:
Distinction in Undergraduate Studies

IN 2020 – 2021 UNM AWARDED*

3,953 BACHELOR'S DEGREES

430 ASSOCIATE DEGREES

261 CERTIFICATES

OF ALL BACHELOR'S DEGREES AWARDED

48.5% WERE TO HISPANIC STUDENTS

4.4% WERE TO AMERICAN INDIAN STUDENTS

*Source: UNM Office of Institutional Analytics

76.1% of degree-seeking students received financial aid*

90 undergraduate degree options available*

205k+ ALUMNI*

*Source: 2021-2022 UNM Catalog, UNM Student Financial Aid Office, UNM Alumni Relations Office

The University of New Mexico:
Nationally Recognized Grad Excellence

IN 2020 – 2021 UNM AWARDED*

62 GRADUATE CERTIFICATES

1,080 MASTER'S DEGREES

376 PROFESSIONAL DOCTORATE DEGREES

164 DOCTORATE DEGREES

OF ALL GRADUATE & PROFESSIONAL DEGREES/CERTIFICATES AWARDED

31% WERE TO HISPANIC STUDENTS

4.6% WERE TO AMERICAN INDIAN STUDENTS

*Source: UNM Office of Institutional Analytics, 2021-2022 UNM Catalog and U.S. News & World Report

40+ TOP 100 NATIONAL rankings for UNM schools, departments & programs*

135 graduate & professional degree programs*

5 grad programs in the TOP 20 in the nation*

- **One University mindset**
  - Better integrating all UNM initiatives across Health, Branch Campuses, and all fields

- **New Mexico's only:**
  - R1 Research University
  - Academic health center
  - NCI-designated comprehensive cancer center

- **UNM's Research Mission**
  - *The mission of UNM Research is to foster and promote research excellence through inter-disciplinary initiatives, cooperative partnerships, excellent facilities, and world-class personnel. UNM Research focuses on innovative solutions for complex problems in the state, the nation, and beyond while creating opportunities to help build better lives for New Mexicans.*

- **High Research Activity**
  - Faculty at UNM submit ~2400 proposals annually
  - UNM currently has ~1800 distinct research awards

University Research Drives Economic Development

- **Direct expenditures**
  - Over $308M in contract & grant funding in FY2020
  - Projected 5-10% annual increases for FY22, FY23

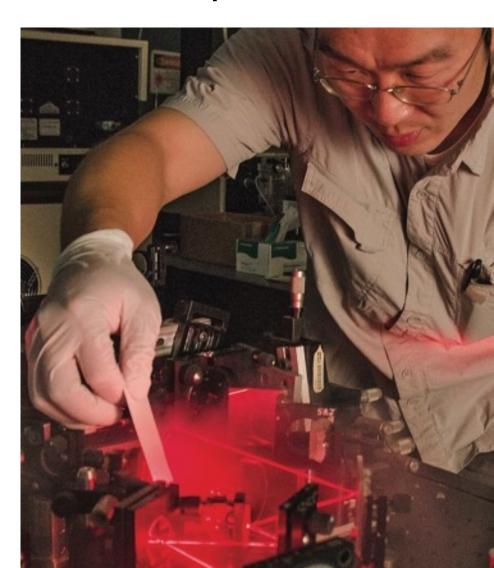- **Innovation and entrepreneurship**
  - Technological innovation
  - Specific products and services
  - Small business startups

- **Creating both technologies and products**
  - More sustainable industries
  - Higher level skills & pay for technology workforce
  - Ability to attract venture capital

- **Employment and workforce development**
  - At UNM (supports ~4500 jobs across UNM campuses)
  - National Labs (Sandia currently employs ~3500 alums)
  - Many other local companies/industries

Commercialization and Startup Companies

- ## UNM Rainforest Innovations affiliated startups[1]

  - Employed ~260 New Mexicans

  - Paid $20.6M in wages and salaries

  - Generated $33.4M in total output

  - Stimulated additional benefits:

    - 457 jobs, $29.4M in labor income, $55.4M economic output

- ## Intellectual Property (IP) development

  - Last 5 years[1]

    - 554 invention disclosures filed

    - 404 U.S. patents filed

    - 291 U.S. patents issued

    - 253 option/license agreements

    - 44 new startup companies

More at UNM Rainforest Innovations presentation on STTC Agenda 2:30 pm Thursday

[1]The Statewide Economic Impact of the University of New Mexico, August 2021; K. O'Donnell
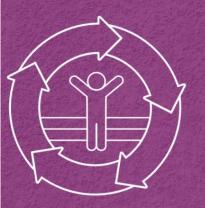
Sustainable Water Resources

Researching resilient and innovative water usage in New Mexico.

Substance Use Disorders

Connecting science, community and policy to empower New Mexicans to prevent and overcome substance use disorders.

Successful Aging

Developing new insights and strategies to help New Mexican older adults live independently and longer.

UNM RESEARCH

THE UNIVERSITY OF NEW MEXICO'S

Grand Challenges

Launched in 2018 by President Stokes

Return on Investment Highlights:

- Substance Use Disorders: UNM IMPOWR Center – NIH funded center focused on opioids and chronic pain, over $10 million / 5 years.
- Water Resources: $15M Multi-institution, interdisciplinary NSF-funded network led by UNM, as a direct output of proposal development workshop.

Total of over $50M related grant funding

Growing the next Grand Challenges

- New Grand Challenge Concept Teams
- Launched Summer 2022

Addressing Infrastructure Needs: Information/Data Institute

- Coordinate education, and research in cybersecurity and data science
  - Train K-12 teachers to instruct the next generation of New Mexico students in cybersecurity and data science
  - Build integrated workforce development pathways from K-12 through college to placement New Mexico companies and national labs
  - Integrate education with cutting edge multidisciplinary research

- UNM has unique, multi-disciplinary assets
  - Quantum information and quantum computing
  - Artificial Intelligence and Machine Learning
  - Data Science
  - Biostatistics
  - Ethics, Privacy, and Bias in Data
  - Application areas (e.g. drug discovery, secure communications and cybersecurity)
  - Center for Advanced Research Computing
  - CTSC Informatics Core
  - And more!

Integrating Art, Technology, and Science

- ## Center for Collaborative Arts and Technology
  - Capitalizes on growing industries of New Mexico and forward-thinking, high-end technology that artists increasingly need to compete in today's economy
  - "Our college is a tapestry woven from so many different and diverse materials, and cross-collaboration is where it all begins."
    - Harris Smith, Dean, College of Fine Arts

- ## UNM Featured at the Prestigious 2022 Venice Biennale Art Exhibition
  - The project, "A Library, a Classroom, and the World", aims to build bridges across places, peoples, and time
  - Multiple media forms and artists celebrating our cultural and natural history and biodiversity

- ## Partnered with Create New Mexico for a successful Phase I EDA Build Back Better award

a Library, a Classroom, and the World

Addressing Regional Needs: Arid Climates

- ## UNM has unique, multi-disciplinary assets

  - Sustainable Water Resources (*current Grand Challenges team*)
  - Center for Water & the Environment
  - Resilience Institute
  - Utton Center (Law School)
  - Water Resources Program
  - Reforestation efforts (multi-institutional effort)
  - NM EPSCoR office
  - Bosque Ecosystem Monitoring Program (BEMP)

  - Drylands Ecosystems (multi-institutional effort)
  - NSF Long Term Ecological Research (LTER) at Sevilleta
  - Population Health: NM health and environmental impacts
  - Art & Ecology
  - METALs program (Clean water)
  - *Wildfire modeling (USGS)*
  - Ameriflux core tower network

- ## Fostering UNM leadership

  - Elevating/organizing current internal assets

  - Creating new overarching institute

  - NSF Regional Innovation Engines (RIE): research & technology focused

  - Northern Rio Grande Corridor Consortium (NRGCC)

More at Water Challenges presentation on STTC Agenda 3:30 pm Thursday

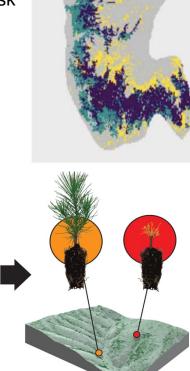# Mitigating Fire Risk & Improving Post-Fire Restoration

- ## Modeling Fire Risk
  - Santa Fe Fireshed modeled to improve the placement of thinning treatments
  - Modeling makes management actions more efficient and effective
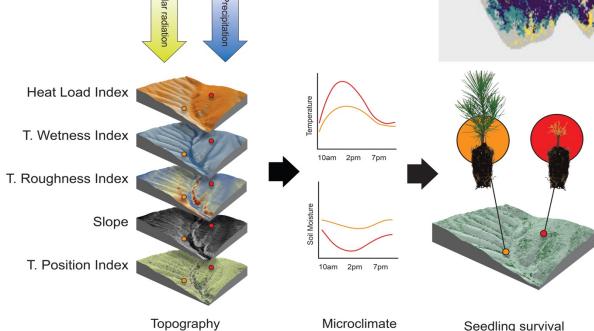
- ## Modeling Reforestation
  - Only 25% of seedlings planted after wildfire survive
  - UNM model can predict survival over 68% of the time to increase replanting success

- ## Creating the Center for Fire Resilient Ecosystems and Society

Santa Fe Forest fire risk model output
- Yellow : no planned thinning, high modeled risk
- Blue-green: planned thinning, low modeled risk
- Purple: planned thinning, high modeled risk

Solar radiation Precipitation

Heat Load Index
T. Wetness Index
T. Roughness Index
Slope
T. Position Index

Temperature

10am 2pm 7pm

Soil Moisture

10am 2pm 7pm

Topography   Microclimate   Seedling survival

Bringing New Industry to NM: Quantum Science

- **Center for High Technology Materials (CHTM)**
  - Instrumentation & expertise in quantum materials

- **Center for Quantum Information & Control (CQuIC)**
  - Recent $3M NSF Award
  - IBM Quantum Hub
  - National Quantum Initiative Centers

- **Roadmap exercise with Sandia (QNM)**
  - Joint institute
  - Strategic benefits for partners

- **Development of QNM Institute**
  - Fall 2022

More at What is Quantum… and Quantum New Mexico presentations on STTC Agenda 9:30 am and 10:00 am Friday
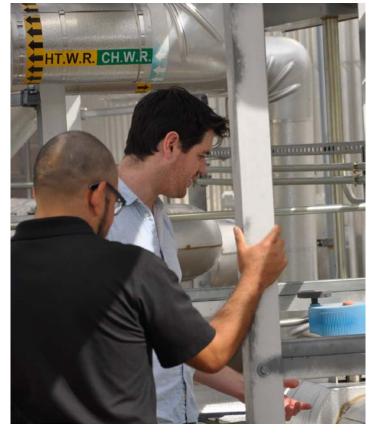
Collaborating Across New Mexico

New Mexico EPSCoR

NM EPSCoR

- Current: **NM SMART Grid Center** (2018 – 2023) establish a sustainable, modular, adaptive, resilient, and transactive electric grid (UNM, NMSU, NMT and SFCC)

- Future: **Center for Research Excellence in Additive Technology and Education (CREATE)** (2023 – 2028) focusing on metal additive manufacturing with accelerated materials discovery using machine learning and artificial intelligence (UNM, NMSU, NMT and Navajo Tech)

- $24M for 5 years; $20M NSF and $4M in state match

Technology Enhancement Fund

- $4 Million in match for the upcoming proposal
- Thanks to HED and NM Legislature for supporting this fund

EPSCoR supported students at the UNM - Mesa del Sol microgrid.

More at Advanced Manufacturing presentation on STTC Agenda 11:00 am Friday

Some additional UNM initiatives

School of Public Health

- Build on College of Population Health in a One University vision

Statewide Education Network

- Aggregating network traffic to support internet for schools
- Sharing expertise and promoting partnership

Statewide Cyber Security Operations Center for Higher Education

- Share expertise and leverage scale

NM Research Innovation Collaborative

- Create more shared space for national labs to engage with faculty and students – entry to a pipeline for innovation

Come Learn More About Our Research, It's Education!

- **SAVE THE DATES**
  MOST EVENTS IN AFTERNOONS AND EVENINGS, FULL SCHEDULE TBD

Thanks!